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Struggling with solutions; a case study of using organisation concepts

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Engineers contribute to the constant flow of new tools and organisation concepts. These tend to be presented as solutions to existing organisational problems. These solutions may become problems themselves, however. We present a longitudinal case of how a truck manufacturer struggled with various similar and dissimilar concepts in realising organisational changes. Whilst it may seem idiosyncratic, the company's struggles are probably typical for organisational change praxis. Reflecting on the case, we present a model to help practitioners reflect on their use of concepts and tools (thereby arguably contributing to the issue we signal).

Keywords: organisation concepts; self-managing teams; human factors; work organisation; lean manufacturing; teamwork; world class manufacturing; management fashion

1. Introduction

> ''The Engineering Industry is as much subject to fashion as any other human activity, and a study of its history reveals a succession of new ideas which have swept into the industrial limelight, each being received as a panacea which is going to revolutionise production, only to make way for some newer idea still. 'Inspection'; 'time and motion study'; 'piece work'; 'job rating'; 'stock control'; each has had its day, made some contribution to management thought, and then receded from the limelight. Every idea has added one more layer to the multi decker sandwich which is management today'',

wrote John Burbidge more than half a century ago (Burbidge 1957, p. 175). If we are to believe commentators such as Pascale (1990) and Eccles and Nohria (1992), the supply of what Burbidge referred to as 'panaceas' has increased rather than decreased since the 1950s. Organisation concepts, tools matching those concepts and software packages are constantly being introduced and promoted, and sometimes succeed in gaining substantial, albeit often passing, attention among practitioners. If so, they are often called 'fads', 'hypes' or 'fashions'. Practitioners face at least two difficulties in deciding whether or not to use a particular concept or tool. In the first place, the fear of staying behind competitors may lead to overly hasty adoption, without an adequate analysis of the concept's suitability. The adoption is then 'solution driven': a concept is intended to solve a problem, but the issue is that the particular problem may not occur in the adopting organisation.

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Secondly, as concepts tend to lend themselves to various interpretations, practitioners must decide how the concepts fit into their own local situation (Benders and Van Veen 2001, Giroux 2006).

As developers and users of tools, engineers need to reflect on the processes behind the development, dissemination and application of concepts and tools. They appear particularly susceptible to the inclination to develop new tools and hence be 'innovative'. John Burbidge himself is a case in point: his critical quote starts a book in which he promoted the novel concept of 'Standard Batch Production' and later he was to become the 'Father of Group Technology' (Suresh and Kay 1998). In general, 'jumping to tools' seems an engineering trait. The literature is replete with approaches that are held to be 'new'; many papers in IJPR can serve as examples. For users other than the developers, this may present a problem, as the addition of every single new concept and tool adds to the already protuberant toolbox, thus further complicating the issue of finding the relevant ideas for the job at hand.

In this paper, we first present a case where several concepts and ideas were applied over a period of more than two decades. We focus on how one specific organisation struggled, and still struggles, to use a host of concepts and tools. Although the description may come across as hectic, it is arguably typical for how organisations attempt to make good use of the steady flow of concepts and tools offered to them (Brunsson and Olsen 1997). We use the case to illustrate a model that is intended to help practitioners apply organisation concepts and tools.

2. Lean production at DAF

The following case is based on a variety of data gathered over the last two decades. The first author started formal research in 1992, using existing informal contacts. Over the course of time there were frequent contacts with several company representatives and several Master students wrote their graduation thesis within the company. In addition, publications in the business press as well as company-issued material were used.

DAF Trucks is a leading European truck manufacturer with production facilities in Eindhoven, the Netherlands, and in Westerloo, Belgium. The first signs of attention to 'lean production' within DAF date back to the second half of 1990. In 1991, DAF publicly announced the implementation of 'lean production' (LP). Top management embraced LP: ''LP was the only idea that got the board enthusiastic in the last ten years'', as a respondent formulated it. This enthusiasm had much to do with DAF's financial difficulties at the time. These were to be mitigated, or even resolved, by introducing LP. One respondent stated that the proposed implementation of LP served as a signal to banks, indicating that DAF was seriously trying to solve its problems and was still creditworthy. At the time, DAF became increasingly dependent on the banks for a continuous supply of short-term credit (Van Oorschot 1996).

LP was promoted forcefully by the member of the Board of Directors responsible for manufacturing. One of his subordinate managers was given the assignment of introducing LP in the organisation. LP's main feature was 'head count reduction' (Van Oorschot 1996). The man in charge of 'lean production' reportedly had as a motto: ''I shall eliminate every job of which I do not understand the job description''. On November 20, 1990, DAF, the unions and the works' council reached agreement on cutting the workforce twice by 6% in 1990 and 1991. In September 1992, a board member announced publicly that the

first landmark had been reached in early 1992 and that DAF would be 'lean' by the end of 1993. The 1991 annual report stated that a "lean enterprise culture" was to be implemented in "all aspects of the organisation". For the years 1992–1994, an additional headcount reduction of 1600 people (approximately 12% of the total workforce) was announced (Vloet 1993). The focus was on directly visible elements. One respondent put it as follows: "one had understood LP's slimness, but failed to understand its suppleness"; he meant that there was hardly any attempt to start working as prescribed in LP textbooks, but that LP was only used to reduce staff numbers.

There are no indications that DAF at that time had worked out a change program to tailor the generic concept of LP to its own organisation. When asked what DAF's version of lean production constituted, the company's spokesman pointed out that the concept entailed "doing more with less staff" and that there were substantial cuts in indirect departments, but that there was no overall company view.

Besides delayering and downsizing, all kinds of change projects continued to be carried out, yet now often presented as part of the endeavour to become 'lean'. Many managers felt there were many similarities between the previous sociotechnical change program of the 1980s and LP. Vloet (1993) interviewed 12 managers at different levels in manufacturing departments. He concluded that, with the exception of three items, DAF managers largely agreed with what MST constitutes. The perceived similarities made it possible to carry out change projects under the label of lean production that were largely inspired by an earlier change program. The existing knowledge of, and experience with, change processes was carried over in the interpretations and projects in the 'lean period'. These largely identical interpretations can be understood how *prima facie* the concepts seem to share similarities such as the stress on flow production, team-based working and fewer hierarchical levels.

At the same time, a project that clearly fits into lean production was carried out, the 'Single-Minute-Exchange-of-Die' project for the heavy presses (Vroomen 1992). This, however, was an isolated project, and not incorporated in a 'lean' design philosophy. Similar efforts had been conducted 10 years earlier (see, more elaborately, Benders (1999)).

All these changes were ultimately unsuccessful in diverting a formal bankruptcy in 1993. However, this did not mean the end of the company. It continued on a smaller basis. In 1996, it was taken over by the US truck manufacturer Paccar and DAF Trucks has been a wholly owned subsidiary since then. The take-over meant improved access to financial resources and investment in new product development and machinery, and organisational change programs were initiated on a substantial scale. 'World Class Manufacturing' became the new banner under which improvement activities were started. Many staff went on Six Sigma training programs. These contributed to quality improvement initiatives throughout the company. Toyota-trained consultants were involved in setting up programs and monitoring progress. In 2006, a brochure entitled 'DAF Production System' was circulated (in the Summer of 2007, this was renamed 'Paccar Production System'). It communicated in an easily understandable fashion some key ideas of the Toyota Production System to all DAF personnel, most notably shop floor employees. It contains all key insights from the Toyota Production System: standardised operating procedures, continuous improvement, zero defects, the elimination of waste and buffers, continuous flow production and collaborative working.

The combined result of all changes has been impressive in productivity terms: the number of trucks produced increased by a factor of 3.5 between 1993 and 2006, whilst the number of employees has only increased slightly. The company has succeeded in realising

this within the existing premises, and is further raising the capacity of its production lines. This does not mean that the basic lean notions are institutionalised throughout the organisation (Olde Monnickhoff 2006). Witteveen (2007) even reported that, in a pilot cell where continuous improvement was experimented with, shop-floor employees did not conform to some standard operation procedures as they doubted their efficacy, whereas the key idea of continuous improvement is that such an issue is reported as an improvement opportunity. The use of standardised operation procedures is not yet common in all parts of the manufacturing process. Therefore, a crucial basis for continuous improvement à la Toyota is not yet commonplace, despite the presence of many persons holding Six Sigma belts. Many difficulties come down to inconsistencies: the Toyota Production System is a complex whole of basic notions and concrete techniques. Many managerial actions at DAF are inconsistent with part of the Paccar Production System, leading to contradictory signals to shop-floor members. For instance, at the end of the month the stress on achieving production targets often leads to the violation of system principles such as carefully working according to standard operating procedures. Recently, it was suggested to create procedures to signal such inconsistencies, so that managers become aware that their own actions often contradict the ideals of the Paccar Production System (Witteveen 2007).

3. Conclusions: on using concepts

The DAF case illustrates how organisation concepts may be used to start change programs. It also shows that organisational change tends to be a cumbersome process. The greater the changes, and the more internal parties involved, the greater chance that interests are affected, resistance occurs and the program falters. Failure is often attributed to the concept used, and scepticism or even cynicism concerning a specific concept or even organisational change in general is likely to emerge. In the DAF case, the term 'lean' became contaminated as it is associated with the traumatic events of 1991–1993; within DAF, the term is still associated with large-scale lay-offs. In such a case, the concept used to start the program easily "wears out through use" (Benders and Van Veen 2001): it becomes associated with failure and may no longer be used to mobilise internal parties to change. If this happens on a considerable scale, the message of failure spreads and the concept may fall into disrepute. If so, this creates opportunities on the supply side: commercial actors such as management gurus and consultants find it increasingly difficult to generate income from the concept in question, and may start to 'innovate': come up with 'new' concepts to satisfy the need for fresh and uncontaminated labels. As the DAF case makes clear, there may be good reasons to shed one label and replace it by another, whilst retaining core insights. The succession of World Class Manufacturing and later the DAF/Paccar Production System exemplifies this: their core ideas are identical. Exactly because concepts are used and changes occur, labels 'wear out' and need replacement. This erosion is strictly local and thus of paramount importance within such a context. One should not throw away the baby with the bathwater, however. Local erosion does not affect the 'classic value' of the underlying ideas. Distinguishing between labels and the underlying notions allows practitioners and academics alike to separate bathwater from babies. Only in that case may one accumulate knowledge: recognise that earlier, and 'locally failed' concepts, may contain a core upon which to build under a different banner, rather than shedding the ideas altogether.

One may reflect on tool use by relating tools to the concepts underpinning them. Figure 1 shows a model distinguishing four different situations of the use and non-use of lean tools and the underlying concepts. The first quadrant, where both the concepts and tools are absent, may seem redundant. However, on a closer look this situation warrants attention. The issue is to consider whether or not the concepts or tools are suitable for resolving existing issues. Organisational mimicry or essentially 'keeping up with the Joneses' is a strong driver for adoption, especially when the concept is fashionable. In a certain way, DAF benefited from LP's fashionability in the early 1990s by signalling to creditors that it was still modern and thus worth lending money to. In the case of 'lean', the matter is more complicated. The adjective is often understood as a synonym for 'superior performance'. This renders the word 'lean' essentially meaningless: if any way of improving performance is called 'lean', the specific philosophy of the Toyota Production System becomes but one way of doing so, and its specific strengths lose their attractiveness. Thus, 'lean' needs to be considered as a means of achieving a goal, rather than becoming a goal in itself. The literature on management fashions shows that, in practice, this danger is often materialised. At the same time, however, DAF Trucks' initial use of 'lean' shows that even such decoupled use can very well be functional.

We labelled the use of a concept without the matching tools 'clumsy'. This clumsiness may easily be remedied by looking for, or even developing, appropriate tools. A key insight, however, is to learn from existing knowledge, i.e. to use available tools. The 'not invented here' syndrome may lead to the reinvention of the wheel (Benders and Vermeulen 2002). If and only if such tools may not be found, it makes sense to develop them internally. The abundance of various labels to disseminate the basic notions of the Toyota Production System alone suggests that this form of waste may be more widespread than commonly assumed (as an aside: one manifestation of avoiding waste is to keep tools as simple as possible. This may not appeal to engineers wanting to display their sophisticated skills, yet it can be argued to be in the true Toyota spirit. For example, during a site visit to Toyota's most modern Japanese plant, one of the authors was guided by a senior manager who proudly showed how second-hand material, partly from bicycles, had been used in constructing a device to supply complex and hard-to-handle parts to the final assembly line).

Using tools without the underlying concept is called 'unfocused' in Figure 1. An outspoken critic of this unfocused use is Steven Spear (Spear and Bowen 1999). The risk is that such applications are unfocused. Much of the history of using various approaches at DAF Trucks seems to fit here: concepts and tools are applied continuously throughout the factory to realise local improvements. Without being embedded in a larger whole, the

		Concepts	
		NO	YES
Tools	NO	suitable?	clumsy
	YES	unfocused	aligned

Figure 1. The use and non-use of lean tools and concept.

potential gains of such improvements will only be partially captured. At another level, the use of tools and approaches may have unanticipated consequences which could have been foreseen had the larger context been considered. This is one reason for the early failure of quality control circles to diffuse widely. Improvements due to suggestions from participating employees initially led to efficiency gains and substantially higher labour productivity, where the latter were materialised by firing shop-floor employees. This, quite naturally, turned out to be an effective way of stopping their colleagues contributing further (Cole 1995, Hill 1995). However, a counter-argument is that working out a coherent change program may take an extended and strenuous process, whereas an abundance of local improvement projects may, even without being embedded in a larger framework, still all contribute to efficiency gains and therefore be beneficial.

The simultaneous presence of both concept and matching tools or 'aligned use' is, obviously, an ideal. DAF Trucks launched various attempts to do this, most recently in the form of the DAF/Paccar Production System. Yet ideals are often hard to reach. Within Toyota Motors, the philosophy was clear in the 1930s. It then took decades to work this out in a systematic approach (Ohno 1988, Holweg 2007). Implementing and putting this into practice is a continuous and difficult process, with ups and downs (Besser 1996, Benders and Morita 2004, Pardi 2007). Over the course of the last three decades, the basic ideas behind the Toyota Production System, including continuous improvement and flow production, have been published under a wide variety of labels, with 'lean' arguably being the most prominent. Before implementing such a concept, practitioners must realise the complexities involved in implementation and the associated pitfalls. At the organisational level, a few critical issues need to be considered.

(1) What concrete purpose is 'lean' going to serve?
(2) How is this going to be worked out in an organisation-wide change program?
(3) How can such a generic program be put to use in concrete change projects within the organisation?

In brief, practitioners need concepts and tools, but their well-considered use is as crucial as their availability.

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